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Market Anomalies and Effect on Returns

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Abstract:

This research aims to analyse market anomalies and their effects on returns in the Indonesian and significant world indexes between 2010 and 2016. The sample period is divided into two sub-periods, 2010 to 2013 and 2014 to 2016 to indicate the persistence of the monthly effect.

This research utilises the purposive sampling method, also known as the judgmental sampling method, of weekly returns from Indonesian indexes and major world indexes based on specific criteria. Consequently, the samples that meet the criteria consist of six Indonesian indexes (BISNIS27, JKSE, KOMPAS100, LQ45, PEFINDO25 and SRIKEHATI) and four major world indexes (the CAC40 from France, Germany's DAX, the FTSE100 from England and Spain's IBEX35).

The ordinary least squares (OLS) and the Generalised Autoregressive Conditional Heteroskedasticity (GARCH) (1, 1) models are used to analyse the data. The findings show an anomalous month of the year effect exists in some Indonesian indexes and major world indexes during the research period.

The intensity of month of the year anomalies diminishes with time. September effects can be found in most Indonesian indexes such as the JKSE during the first sub-period. January and April's effects are found in later sub-periods. For the major world indexes, May's effect is found in Spain's IBEX35 in the earlier sub-period, and February's effect is found in England's FTSE100 in the later sub-period. The research also indicates that month of the year effects are more persistent among indexes with smaller market capitalisation.

Keywords: *Market anomalies, month of the year effect, return, GARCH models.*

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1. Introduction

The greater an investor's profit, the greater the risk he or she must be willing to bear. Therefore, investors need relevant information to make investment decisions. Relevant information on the condition and direction of a market will be accessible to investors if the market is efficient (Arnold *et al.*, 2012; Lee and Lee, 2015; Denisova *et al.*, 2017).

Bhuyan (2018) and Chandra (2017) in his book argue that an efficient market can show actual stock prices as well as assure the correctness of the circumstances displayed. Research on the efficiency of capital markets is mostly complete. These studies find the opposite of the concept of efficient capital markets in some capital markets, that is when the state of the stock does not match existing information.

Bodie *et al.* (2012) and Reilly and Brown (2002) in their works classified three categories of market efficiency based on information including weak form efficiency, semi-strong form efficiency and stable form efficiency. A discussion of efficient market testing cannot be separated from a discussion of the existence of the deviations and irregularities associated with the efficient market hypotheses. Deviations and irregularities are called *market anomalies*. Jiang and Autore (2014) and Onoh and Ndu-Okereke, (2016) state that various conditions in a capital market will cause impacts that can be seen in the fluctuation of stock prices in a capital market. Unpredictable conditions with paradigms or empirical theories in a capital market are also commonly called *market anomalies.* In other words, a *market anomaly* is a symptom of a deviation or an inconsistency in the capital market hypothesis.

One such market anomaly is the month of the year effect. According to Jahfer and Inoue (2014) the *month of the year effect* refers to the phenomenon whereby the stock returns in selected months are higher than in other months. The most common and exciting findings from the above studies of the monthly effect anomaly within a year are the "January effect" and the "April effect". Thus, a stock price may increase or decrease from month to month in one trading year in a capital market. This behaviour is called the *month of the year effect.* The *month of the year effect* refers to the difference in monthly returns in each month of the year. Specifically, this study aims to analyse the phenomenon of a market's anomalous month of the year effect on the indexes of Indonesia and the world's primary indexes.

1. Theoretical Basis

2.1 Understanding Capital Markets

A capital market is an essential mean in an economy that serves to mobilise funds from citizens to productive sectors. A company is a party that needs funds and can raise them through the capital market by selling its shares to the public or issuing

bonds. Meanwhile, investors are a party with funds who can use the capital market as an alternative investment to gain profits (Rathinasamy and Mantripragada, 1996; Tong, 1992; Thalassinos *et al.,* 2012; 2013).

Piketty (2015) in his book mentions that the benefits of capital markets are that they provide sources of financing (long-term) for the business world as well as allow the optimal allocation of fund resources; give vehicles to investors while enabling diversification efforts; provide leading indicators for the country's economic trends; distribute company ownership to the middle class; spread ownership, openness and professionalism; create a healthy business climate; increase employment or number of profession and give the opportunity to have a healthy and prospective company.

2.2 Market Efficiency

Market efficiency can be defined as the relationship between security prices and the information in circulation. A market is said to be efficient if no one individual investor or institutional investor can earn abnormal returns, adjusted for risk, using existing trading strategies (Wong *et al.,* 2006; Zhang, Lai *et al.,* 2017).

Bodie *et al.* (2012) in his publication distinguishes three types of efficient market hypotheses based on "all available information". The weak form hypothesis states that stock prices already reflect all the information that can be gained by examining market trading data such as a history of past prices, trading volume or short-term interest rates. The semi-strong form hypothesis advances the concept that all publicly available information regarding a company's prospects should be reflected in stock prices. A secure form of the efficient market states that stock prices reflect all the relevant information on a company (e.g., annual reports, income statements, filings for the Security and Exchange Commission, etc.) even including information that is only available to people within the company (Clarke *et al.,* 2008).

2.3 Market Anomalies

A market anomaly is an irregular condition that is inappropriate or deviates from an efficient market hypothesis. The anomaly here is one of the phenomena in the marketplace, where things are found that should not exist and it is assumed that efficient markets exist. Investors can take advantage of conditions in the event of market anomalies to gain abnormal returns on investments (Wong *et al.,* 2006; Zhang *et al.,* 2017).

Jamróz Paweł and Koronkiewicz (2014) Lopez Bernal *et al.* (2013) and Moskowitz *et al.* (2012) state that an anomalous analysis is usually based on observations of long-term financial time series to study its effects and its repetition. Long-term series must be significant because they lower the likelihood of detecting related

phenomena. An ongoing anomaly is a necessary condition to create a profitable investment strategy.

2.4 Month of the Year Effect

Schwert (2003) argued that calendar anomalies are empirical results that are inconsistent with the behaviour theory of asset valuation. This claim is supported by Hawaldar *et al.* (2017) and Jain (2017). One of the anomalies that surfaced calendar month of the year is the effect that is the pattern in certain months of each year. Jahfer and Inoue (2014) suggest the most common findings regarding the study of the month of the year effect are the "January effect" and the "April effect". It is well known that stock returns in January and April are significant and different from other months of the year yield. This violates the efficient market hypothesis (EMH) partly developed by Fama in the 1960s (Fama, 1960; 1998).

Sharpe *et al.* (1999) say there are three causes of the January effect, that is tax-loss selling, window dressing and small and beta stocks. *Tax-loss selling* is selling stocks with a low value with the goal of reducing tax debt, while *window dressing* sells stocks with low value so the year-end portfolio of a company looks good. A *small* or *beta stock* is the tendency in January for more small companies to provide a higher level of return compared to large companies.

2.5 Stock Returns

Bekaert and Hodrick, (2017) define a return as the result obtained from an investment. The return may be for an investment that has occurred or expectations that have not happened yet but are expected to happen in the days to come. The stock returns for each day can be counted using the following formula (Floros and Salvador, 2014; Georgantopoulos *et al.*, 2011; Thalassinos *et al.*, 2015):

$$Rt = \ln(Pt/Pt–1) \times 100$$

Where:
Rt: Return of stock on day t
Pt: The closing price (closing price) on day t
Pt–1: The closing price (closing price) on day t–1

2. Research Methodology

The subject of this study is several indexes in Indonesia, including the Jakarta Composite Index (JKSE), LQ45 (JKLQ45), BISNIS27 (JKBI27), KOMPAS100 (JKKM100), PEFINDO25 (JKPEF25), SRIKEHATI (JKSRI) and those among the world's major indexes, such as the CAC40 (F40) from France, Germany's DAX (GDAXI), Spain's IBEX35 (IBEX) and the UK's FTSE100 (FTSE). The study

period ranges from January 2010 to December 2016, with a sub-period from 2010 to 2013 and another from 2014 to 2016. The data used in this research is a weekly report consistent with the historical price index during the study period.

The data analysis consisted of several stages, namely calculating each return from January 2010 to December 2016 and then grouping the calculated return indexes into months. Furthermore, a market analysis test sought anomalous month of the year effects. In this test, the examiner tried to analyse the existence of market anomalies regarding the month of the year effect on some Indonesian indexes and the world's major indexes during the observation period, that is 2010 to 2016 and the sub-periods 2010 to 2013 and 2014 to 2016. Researchers in similar studies have used the linear regression test (OLS) and the Generalised Autoregressive Conditional Heteroskedasticity (GARCH) method.

3.1 Linear Regression Test

Modelling was performed by entering a dummy variable with the regression equation, as presented below:

$$Rt = \beta_0 + \beta_1 D_{Jan} + \beta_2 D_{Feb} + \beta_3 D_{Mar} + \beta_4 D_{Apr} + \beta_5 D_{May} + \beta_6 D_{Jun} + \beta_7 D_{Jul} + \beta_8 D_{Aug} + \beta_9 D_{Sept} + \beta_{10} D_{Okt} + \beta_{11} D_{Nov} + et$$

where:
Rt: Monthly Return index in t;
β1, β2, ... β11: Regression coefficients for the dummy variable of each month except one;
DJan, DFeb, ... DNov: Dummy for each month except one;
DJan value = 1 for the return on trade in January and 0 in other trades;
DFeb value = 1 for the return on trade in February, 0 in other trades, and so on.

The regression coefficient indicates the magnitude of the average return on the trading day to t.

Hakim (2014) remarked that, to obtain an estimator with the desired properties, or BLUE (Best Linear Unbiased Estimator), OLS should meet standard assumptions. The classical assumptions in the linear regression model are as follows:

1) $E(u_i|X_i) = 0$; the mean residual is 0.
2) $E(U_i|X_i - E(U_i|X_i))^2 = \sigma^2$. The variance of the residuals is constant, known as the assumption's homokedastisitas.
3) $E(U_i|X_i - E(U_i|X_i))(U_j|X_j - E(U_j|X_j)) = 0, _i \neq _j,$ or there is no serial correlation between the residuals, known as the assumption of no serial correlation.

3.2 The ARCH and GARCH Tests

Because the researcher is using time series data, error variance conditions were often found that are not constant. Consequently, the time series data has a heteroskedasticity problem. Chatfield (2016), Fryzlewicz and Subba Rao (2014) argued that an ARCH or GARCH (Auto-Regressive Conditional Heteroskedasticity or General Autoregressive Conditional Heteroskedasticity) error that does not assume a constant variance (heteroskedasticity) is not a problem, but it can safely be used for modelling and forecasting. The basic equation using ARCH modelling is as follows:

$$Rt = \beta_1 D_{Jan} + \beta_2 D_{Feb} + \beta_3 D_{Mar} + \beta_4 D_{Apr} + \beta_5 D_{Mei} + \beta_6 D_{Jun} + \beta_7 D_{Jul} + \beta_8 D_{Aug} + \beta_9 D_{Sept} + \beta_{10} D_{Oct} + \beta_{11} D_{Nov} + \beta_{12} D_{Dec} + \sum_{j=1}^{4} b_j + {}_5 r_{t-j} + \varepsilon_t$$

In their work Nachrowi and Usman (2006) remarked that the ARCH model is used to overcome the uncertainty of residual risk. The advantage of this approach is that conditional variance, or short-term volatility, is a function of the error on the returns of the past. To find the appropriate modelling, we can add a more substantial number of orders (q) to the ARCH model. Additional orders (q) will result in residual changes. Besides, the relatively large number of (q) will result in the number of parameters to be estimated. The more parameters that must be estimated, the less precise the estimators. This is commonly encountered in tests using monthly data.

Bollerslev (1986) commented that the GARCH method is used when there is an error variance depending on the squared error terms during the last period of the data set. The modelling of GARCH follows:

$$\sigma_t^2 = \alpha_0 + \sum_{i=1}^{q} \alpha i \varepsilon^2_{t-1} + \sum_{i=1}^{p} \gamma \sigma^2_{t-}$$

The appropriate model to describe the volatility of stock returns during the observation period will be the detection of the presence effect month of the year on the results. Here is the research hypothesis for the test:

H0: β1, β2, ... β11 = 0
H1: β1, β2, ... β11 ≠ 0

When the probability value is < α = 5%, then there is an anomalous month of the year effect in other words, H0 is rejected. This indicates that the return of a certain month is different from others. Meanwhile, when the probability value is > α = 5%, then there is no anomalous month of the year. Thus, the conclusions drawn are not to reject H0. A further diagnostic issue as a feasibility test for GARCH is that the sum of the ARCH and GARCH coefficient should not be more than 1 (α + β <1) (Shochrul and Ajija, 2011).

3. Research Results and Discussion

Some of the indexes in the period 2010 to 2016 and the two sub-periods show a significant probability value at $\alpha = 5\%$, indicating the existence of a market anomaly month of the year effect. In the period 2010 to 2016, the effect on several indexes is seen regarding March, July, August, September and October. Furthermore, for the sub-period 2010 to 2013, the effects of March, May, July, September and October are observed, while for the sub-period 2014 to 2016, the significant effects are in January, February, April, August and September.

Chia and Liew (2012) search for any month of the year effect on the Nikkei 225 index of the Tokyo Stock Exchange (Tokyo Stock Exchange/TSE). The method used is Regression and TGARCH. The result of this research is the November effect on the NIKKEI 225 index. The month of the year effect shows that, through the correct strategy of investing with respect to time, money managers, financial counsellors and investors can take advantage of this pattern.

Table 1. *The Existence of the Month of the Year Effect from 2010 to 2016*

Index	Method	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
BISNIS27	OLS	0.004	0.0071	0.0077	-0.0019	-0.0043	0.0014	0.0077	-0.0057	0.0017	0.0063	-0.0013	0.0031
	GARCH (1,1)	0.0073	0.0079	0.0072	-0.0053	-0.0056	0.0048	0.0062	-0.0036	**0.0092**	0.005	-0.0035	0.002
JKSE	OLS	0.0037	0.0061	0.0078	0.0013	-0.0031	0.0001	0.0067	-0.0051	0.0021	0.0051	-0.0004	0.0027
	GARCH (1,1)	0.0037	0.0061	0.0078	0.0013	-0.0031	0.0001	0.0067	-0.0051	0.0021	0.0051	-0.0004	0.0027
KOMPAS100	OLS	0.0038	0.0069	0.0075	-0.0001	-0.0039	0.0000	0.0062	-0.0059	0.0013	0.0055	-0.0007	0.0024
	GARCH (1,1)	0.0077	0.0075	0.0067	-0.0042	-0.0034	0.0028	0.0062	-0.0042	**0.0086**	0.0037	-0.0018	0.0003
LQ45	OLS	0.0043	0.0067	0.0074	-0.0003	-0.003	0.0011	0.0064	-0.0053	0.002	0.006	-0.001	0.0024
	GARCH (1,1)	**0.0088**	0.0074	0.0068	-0.0041	-0.003	0.004	0.0058	-0.0039	**0.009**	0.0041	-0.0022	0.0013
PEFINDO25	OLS	0.003	0.0069	**0.0105**	0.0032	0.0011	-0.0028	0.0044	**-0.0112**	0.0009	0.0061	-0.0025	0.0045
	GARCH (1,1)	0.0063	0.008	**0.0102**	0.0031	-0.0007	0.0037	**0.0107**	-0.0091	**-0.0073**	0.0021	-0.0011	0.0045
SRI KEHATI	OLS	0.004	0.0069	0.0084	-0.0004	-0.0033	0.0022	0.0088	-0.0047	0.0018	0.0049	-0.002	0.0022
	GARCH (1,1)	0.0081	0.0076	0.0077	-0.0042	-0.0042	0.0053	0.0085	-0.0031	**0.0088**	0.004	-0.0032	0.0022
CAC40	OLS	0.0006	0.0071	0.0018	-0.001	-0.0073	-0.0002	0.0006	-0.0035	0.0016	0.0069	0.001	0.0022
	GARCH (1,1)	0.0017	0.006	0.0023	0.0025	-0.0049	-0.0003	0.0044	-0.002	0.0023	0.005	-0.0001	0.003
DAX	OLS	0.0017	0.0062	0.0042	0.0000	-0.0046	-0.0012	-0.0005	-0.0067	0.0031	**0.0109**	0.0066	0.001
	GARCH (1,1)	0.0016	0.0057	0.0051	0.0002	-0.0041	-0.0043	0.0023	-0.0032	0.0041	0.0089	0.0074	0.0022
FTSE100	OLS	-0.0006	0.0085	-0.0019	0.0019	-0.0065	0.0006	0.0017	-0.0023	0.0000	0.0057	-0.0005	0.0037
	GARCH (1,1)	-0.0006	0.0085	-0.0019	0.0019	-0.0065	0.0006	0.0017	-0.0023	0.0000	0.0057	-0.0005	0.0037
IBEX35	OLS	-0.0039	0.0023	0.0000	-0.0031	-0.0107	-0.0005	-0.0007	-0.0015	0.0069	0.0038	-0.0019	0.002
	GARCH (1,1)	-0.0024	0.0019	0.0019	0.0004	-0.0089	-0.0027	0.0028	-0.0024	0.0056	0.0043	-0.0027	0.0026

Source: *Research data processed by Eviews9 (2017).*

Table 2. *The Existence of the Month of the Year Effect from 2010 to 2013*

Index	Method	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
BISNIS27	OLS	-0.0012	0.0078	0.0102	0.0044	-0.008	0.0004	0.0068	-0.0079	0.0094	0.0068	-0.0059	0.001
	GARCH (1,1)	0.0026	0.0066	0.0126	0.0018	**-0.0141**	0.0075	0.0039	-0.0029	**0.0138**	0.0059	-0.0064	-0.0007
JKSE	OLS	0.0000	0.006	0.0112	0.006	-0.0062	-0.0005	0.0064	-0.0061	0.0084	0.0061	-0.0029	0.0014
	GARCH (1,1)	0.0026	0.0051	0.0124	0.0035	-0.0092	0.003	0.0044	0.0006	**0.0147**	0.0051	-0.0031	-0.0004
KOMPAS100	OLS	-0.0012	0.0066	0.0106	0.005	-0.0076	-0.0003	0.0059	-0.0076	0.0086	0.0061	-0.0044	0.0008
	GARCH (1,1)	0.0021	0.0058	0.0124	0.0024	-0.0102	0.0047	0.0041	-0.0034	**0.0153**	0.0045	-0.0044	-0.0014
LQ45	OLS	-0.0015	0.007	0.0102	0.0044	-0.0064	0.0011	0.0065	-0.0073	0.0093	0.0067	-0.0056	0.0005
	GARCH (1,1)	0.0016	0.0061	0.0125	0.002	-0.0096	0.0066	0.0047	-0.0056	**0.0148**	0.0043	-0.0052	-0.0006
PEFINDO25	OLS	0.0021	0.0026	0.0153	0.0073	-0.0009	-0.0048	0.0009	-0.0147	0.0143	0.0092	-0.0019	0.0031
	GARCH (1,1)	0.0052	0.003	**0.0139**	0.0076	-0.009	0.007	**0.0095**	-0.0156	0.0077	0.0046	0.001	0.0037
SRI KEHATI	OLS	-0.0024	0.0075	0.0111	0.0057	-0.0072	0.002	0.0091	-0.0067	0.0096	0.0055	-0.0069	-0.0001
	GARCH (1,1)	0.0007	0.0061	0.0134	0.0038	**-0.0129**	0.0078	0.0075	-0.0039	**0.0128**	0.0047	-0.0064	-0.0004
CAC40	OLS	0.0026	0.0025	0.0012	-0.0037	-0.0124	0.0012	0.0004	-0.005	0.006	0.0092	-0.0016	0.0028
	GARCH (1,1)	0.007	0.0005	0.003	0.003	-0.0089	0.0018	0.0123	-0.0023	0.0045	0.0076	-0.0012	0.0025
DAX	OLS	0.0052	0.0027	0.0045	0.0017	-0.0077	-0.0002	0.0003	-0.0102	0.0106	**0.0135**	0.0049	-0.0006
	GARCH (1,1)	0.0052	0.0027	0.0045	0.0017	-0.0077	-0.0002	0.0003	-0.0102	0.0106	0.0135	0.0049	-0.0006
FTSE100	OLS	0.0025	0.0067	-0.0009	-0.0001	-0.0099	-0.0006	0.0017	-0.0005	0.0018	0.0092	-0.0019	0.0044
	GARCH (1,1)	0.0025	0.0067	-0.0009	-0.0001	-0.0099	-0.0006	0.0017	-0.0005	0.0018	0.0092	-0.0019	0.0044
IBEX35	OLS	-0.0021	-0.0015	-0.0047	-0.0067	**-0.0177**	0.005	-0.001	0.0001	0.0157	0.0037	-0.0034	0.0028
	GARCH (1,1)	0.0007	-0.0037	-0.0033	0.0019	**-0.0173**	0.0014	0.0076	-0.002	0.0138	0.0045	-0.0046	0.0038

Source: *Research data processed by Eviews9 (2017).*

In the overall period and the sub-period of 2010 to 2013, the September effect is seen in almost all Indonesian indexes. This means that issues are affecting Indonesia's capital market during this month probably because of the Islamic holy day of Eid al-Adha occurred in September during the study period. There is the possibility that Eid al-Adha affected the Indonesian capital market in September because the vast majority of the Indonesian population is Islamic. Accordingly, this celebration affects the Indonesian capital market but not the world's major capital markets in the research results. In addition, in the sub-period 2014 to 2016, the effect of April on almost all indexes of Indonesia can be attributed to the celebration of the Prophet's Mawlid, or birthday, which occurs in April.

Based on the research results, in the sub-period 2014 to 2016, the January effect was significant, but not in the sub-period 2013 to 2013. Based on research by Chen (2013), the reason why the risk is higher only in January can be seen from the results of the sample period. It implies that a market's return volatility increases with the closure announcements of financial statements. Due to the uncertainty associated with a company's performance, investors will sell stocks to avoid possible risks, leading to increased market volatility. The research results demonstrate the seasonal effect, which is defined as the fact that, in a given calendar month, the mean market return is significantly higher than in other months throughout the year

due to the compensation for higher market volatility. Increased market volatility is associated with the uncertainty linked to the announcement of financial statements.

From the results of the entire study, it appears that the effect of the year's number of months on Indonesia's indexes is higher than the world's major indexes. The Indonesia Stock Exchange (IDX) revealed the growth of Indonesia's stock index experienced the second-highest growth rate in the Asia Pacific region. However, the stock market capitalisation of Indonesia lags is far behind compared to other countries. JCI's growth beat the benchmark indexes in Thailand, the Philippines, Hong Kong, Singapore, Malaysia and Japan. Unfortunately, despite the high growth experience the stock market capitalisation in Indonesia is still quite small.

Jassal and Dhiman (2015) examined the month of the year effect on the BSE (Bombay Stock Exchange). There are still anomalies in the Indian stock market, but they are more prominent in small- and medium-capitalisation stocks. Therefore, there are opportunities available to investors in the Indian stock market. Investors can plan a strategy for their portfolios following the abnormal anomalous benefits of India's stock market.

Table 3. *The Existence of Month Effect in 2014 to 2016*

Index	Method	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
BISNIS27	OLS	0.0116	0.0061	0.0046	-0.0107	0.0005	0.0028	0.0089	-0.0031	-0.0099	0.0057	0.004	0.0063
	GARCH (1,1)	0.0125	0.0078	0.0031	**-0.0183**	0.0004	0.0049	0.0122	-0.0026	-0.0031	0.0057	0.0000	0.0058
JKSE	OLS	0.009	0.0062	0.0037	-0.0054	0.0009	0.0008	0.0072	-0.0038	-0.0074	0.0037	0.0025	0.0046
	GARCH (1,1)	**0.0096**	0.0075	0.0023	**-0.008**	0.0012	0.0023	0.0102	-0.0022	-0.0043	0.0039	0.0009	0.0037
KOMPAS100	OLS	0.0112	0.0072	0.0037	-0.0075	0.001	0.0006	0.0066	-0.0039	-0.0095	0.0046	0.0034	0.0048
	GARCH (1,1)	**0.0125**	0.0089	0.0015	**-0.0115**	0.0014	0.0026	0.0102	-0.0028	-0.0038	0.0052	0.0011	0.003
LQ45	OLS	0.0127	0.0062	0.0039	-0.0069	0.0013	0.0011	0.0062	-0.0028	-0.0089	0.0051	0.0042	0.0054
	GARCH (1,1)	**0.0144**	0.0082	0.0013	**-0.0105**	0.0017	0.0033	0.0089	-0.0027	-0.0031	0.0058	0.0017	0.0041
PEFINDO25	OLS	0.0043	0.0127	0.0047	-0.0025	0.0036	-0.0002	0.0092	-0.007	**-0.0192**	0.0017	-0.0033	0.0065
	GARCH (1,1)	0.0079	0.0135	0.0067	-0.0017	0.0039	0.001	0.011	**-0.0047**	-0.0187	0.0008	-0.0035	0.0063
SRI KEHATI	OLS	0.0132	0.0061	0.0053	-0.0089	0.0017	0.0024	0.0084	-0.0022	-0.0099	0.0041	0.0036	0.0056
	GARCH (1,1)	**0.0139**	0.0082	0.003	**-0.0132**	0.0024	0.0053	0.0119	-0.0026	-0.0004	0.0054	0.0007	0.0054
CAC40	OLS	-0.0023	0.0131	0.0026	0.0027	-0.0007	-0.0021	0.0008	-0.0017	-0.0051	0.0038	0.004	0.0012
	GARCH (1,1)	-0.0023	0.0131	0.0026	0.0027	-0.0007	-0.0021	0.0008	-0.0017	-0.0051	0.0038	0.004	0.0012
DAX	OLS	-0.0036	0.0109	0.0039	-0.0023	-0.0005	-0.0025	-0.0015	-0.0025	-0.0081	0.0072	0.0086	0.0034
	GARCH (1,1)	-0.002	0.013	0.0032	-0.0061	0.0005	-0.0012	-0.0005	0.0014	-0.0047	0.019	0.0098	0.0046
FTSE100	OLS	-0.0052	0.011	-0.003	0.0047	-0.002	0.0022	0.0016	-0.0044	-0.0028	0.0007	0.0011	0.0026
	GARCH (1,1)	-0.0038	**0.0116**	-0.0036	0.0047	-0.0019	-0.0007	0.0033	-0.0019	-0.0028	0.0001	0.0015	0.0075
IBEX35	OLS	-0.0065	0.0074	0.0057	0.002	-0.0017	-0.0076	-0.0002	-0.0034	-0.0065	0.0039	-0.0001	0.0007
	GARCH (1,1)	-0.009	0.0076	0.0055	0.0027	-0.002	-0.0076	-0.0003	-0.0038	-0.0066	0.0037	0.0001	0.0012

Source: *Research data processed by Eviews9 (2017).*

4. Conclusions and Recommendations

From the data analysis and discussion of research results, the following conclusions can be made:

1. The results showed the phenomenon of the month of the year effect by using the GARCH (1,1) and OLS models with Indonesian indexes in the period 2010 to 2016 and the sub-period 2014 to 2016. In the sub-period from 2010 to 2013, the research revealed the phenomenon of the month of the year effect on Indonesian indexes using the GARCH (1,1) model; however, there were no phenomena regarding the month of the year and the sub-period effect by using the OLS model.
2. Results from the period 2010 to 2016 using GARCH (1,1) did not find a month of the year effect on the world's major indexes. However, using the OLS model had a positive effect in October on the DAX. In the sub-period of 2010 to 2013, the results of the research showed the effect of May on the IBEX35 index using the GARCH model (1,1). While using the OLS model, the May effect was found on the IBEX35 index and the October effect on the DAX. In the sub-period 2014 to 2016, the results of the study showed the effects of February on the FTSE100 index with the GARCH test (1,1). However, using the OLS model, there was no finding for any month of the year.
3. The phenomenon of the month of the year effect on Indonesia and the world's major indexes in the sub-period 2010 to 2013 did not appear persistent during the sub-period 2014 to 2016. Some of the effects found in the earlier sub-period seem to disappear in the next sub-period, but effects of other months were found in the next sub-period. From the output of data, GARCH (1,1) looks better to describe the market anomaly month of the year effect compared with the effect using the OLS model. The results show that the Indonesian capital market is inefficient compared with some major world capital markets. The Indonesian market is inefficient compared to itself because of its large market capitalisation. From the above conclusions, if investors can take advantage of the phenomenon of the month of the year effect to earn more profit, we recommend investors invest in Indonesia's capital market compared to some of the world's major capital markets due to the high volatility of its stock prices.

Some suggestions for future researchers who will conduct similar studies are the following:

1. Researchers are further advised to use analytical testing with different techniques. Moreover, compare it with the method that has been used in this research. Additionally, give the results regarding which method is better.
2. Further research will examine all the indexes in Indonesia and test more major world indexes in comparing this research to provide a broader view.

3. It is expected that the research period undertaken by the researcher can then be extended and use more sub-periods to compare sub-period to sub-period and obtain better results.

References:

Arnold, V., Bedard, J.C., Phillips, J.R., and Sutton, S.G. 2012. The impact of tagging qualitative financial information on investor decision making: Implications for XBRL. International Journal of Accounting Information Systems, 13(1), 2-20.

Bekaert, G. and Hodrick, R. 2017. International financial management. Cambridge University Press.

Bhuyan, R. 2018. Investments and Security Analysis. Finance.

Bodie, Z., Kane, A. and Marcus, A.J. 2012. Essentials of Investments 9th Edition. McGraw-Hill.

Bollerslev, T. 1986. Generalized autoregressive conditional heteroskedasticity. Journal of Econometrics, 31(3), 307-327.

Chandra, P. 2017. Investment analysis and portfolio management. McGraw-Hill Education.

Chatfield, C. 2016. The analysis of time series: An introduction. CRC press.

Chen, Q. 2013. Risk and seasonal effects: International evidence. Journal of Chinese Economic and Business Studies, 11(4), 299-311.

Chia, R. C.J. and Liew, V.K.S. 2012. Month-of-the-Year and Symmetrical Effects in the Nikkei 225. Journal of Business and Management, 3(2), 68-72.

Clarke, J., Jandik, T. and Mandelker, G. 2008. The Efficient Markets Hypothesis. African Journal of Business Management, 3(17), 28-56. http://doi.org/10.1007/BF01539560

Denisova, P.I., Rukina, N.S., Samoylova, N.K., Takmazyan, S.A. 2017. Financial Instruments of the Socially Responsible Economy. European Research Studies Journal, 20(1), 284-293.

Fama, E.F. 1960. Efficient market hypothesis. Ph. D. dissertation, University of Chicago, Graduate School of Business.

Fama, E.F. 1998. Market efficiency, long-term returns, and behavioral finance. Journal of Financial Economics, 49(3), 283-306.

Floros, C. and Salvador, E. 2014. Calendar anomalies in cash and stock index futures: International evidence. Economic Modelling, 37, 216-223.

Fryzlewicz, P. and Subba Rao, S. 2014. Multiple-change-point detection for auto-regressive conditional heteroscedastic processes. Journal of the Royal Statistical Society: Series B (Statistical Methodology), 76(5), 903-924.

Georgantopoulos, A.G., Kenourgios, D.F. and Tsamis, A.D. 2011. Calendar anomalies in emerging Balkan equity markets. International Economics and Finance Journal, 6(1), 67-82.

Hawaldar, I.T., Shakila, B. and Pinto, P. 2017. Empirical Testing of Month of the Year Effect on Selected Commercial Banks and Services Sector Companies Listed on Bahrain Bourse. International Journal of Economics and Financial Issues, 7(2), 426-436.

Jahfer, A. and Inoue, T. 2014. Financial development, foreign direct investment and economic growth in Sri Lanka. International Journal of Economic Policy in Emerging Economies, 7(1), 77-93.

Jain, N. 2017. Illusion or Reality: Testing the Day-of-the-Week and Month-of-the-Year Effect for Indian Stock Market. Asian Journal of Research in Banking and Finance, 7(4), 75-84.

Jamróz Pawełand Koronkiewicz, G. 2014. The Occurrence of the Day-of-the-Week Effects on Polish and Major World Stock Markets. Studies in Logic, Grammar and Rhetoric, 37(1), 71-88.

Jassal, T. and Dhiman, B. 2015. Heterogeneous Evidence: An Analysis of Monthly Anomaly. International Journal of Applied Business and Economic Research, 13(3), 1377-1389.

Jiang, D. and Autore, D.M. 2014. The Preholiday Corporate Announcement Effect.

Lee, I. and Lee, K. 2015. The Internet of Things (IoT): Applications, investments, and challenges for enterprises. Business Horizons, 58(4), 431-440.

Lopez Bernal, J.A., Gasparrini, A., Artundo, C.M. and McKee, M. 2013. The effect of the late 2000s financial crisis on suicides in Spain: an interrupted time-series analysis. The European Journal of Public Health, 23(5), 732-736.

Moskowitz, T.J., Ooi, Y.H. and Pedersen, L.H. 2012. Time series momentum. Journal of Financial Economics, 104(2), 228-250.

Nachrowi, N.D. and Usman, H. 2006. Econometrics For Economic and Financial Analysis. Issuing FEUI.

Onoh, J.O. and Ndu-Okereke, O.E. 2016. Day of the Week Effect: Evidence from the Nigerian Stock Exchange. International Journal of Banking and Finance Researc, 2(3), 76-90.

Piketty, T. 2015. About capital in the twenty-first century. American Economic Review, 105(5), 48-53.

Rathinasamy, R.S. and Mantripragada, K.G. 1996. The January size effect revisited: is it a case of risk mismeasurement? Journal of Financial and Strategic Decisions, 9(3), 9-14.

Reilly, F.K. and Brown, K.C. 2002. Investment analysis and portfolio management.

Schwert, G.W. 2003. Anomalies and market efficiency. In Handbook of the Economics of Finance, 1, 939-974.

Sharpe, W.F., Alexander, G.J. and Bailey, J.V. 1999. Investments (International Edition). Prentice Hall, Inc. New Jersey.

Thalassinos, I.E., Pintea, M. and Ratiu, I.P. 2015. The Recent Financial Crisis and Its Impact on the Performance Indicators of Selected Countries during the Crisis Period: A Reply. International Journal of Economics and Business Administration, 3(1), 3-20.

Thalassinos, I.E., Hanias, P.M., Curtis, G.P. and Thalassinos, E.J. 2013. Forecasting financial indices: The Baltic Dry Indices. Marine Navigation and Safety of Sea Transportation: STCW, Maritime Education and Training (MET), Human Resources and Crew Manning, Maritime Policy, Logistics and Economic Matters; Code 97318, 283-290, ISBN: 978-113800104-6.

Thalassinos, I.E., Hanias, P.M. and Curtis, G.P. 2012. Time series prediction with neural networks for the Athens Stock Exchange indicator. European Research Studies Journal, 15(2), 23-31.

Tong, W.H.S. 1992. An analysis of the January effect of United States, Taiwan and South Korean stock returns. Asia Pacific Journal of Management, 9(2), 189-207.

Wei, W.W.S. 2006. Time series analysis. In the Oxford Handbook of Quantitative Methods in Psychology, Vol. 2.

Wong, W.K., Agarwal, A. and Wong, N.T. 2006. The disappearing calendar anomalies in the Singapore stock market. The Lahore Journal of Economics, 11(2), 123-139.

Zhang, J., Lai, Y. and Lin, J. 2017. The day-of-the-Week effects of stock markets in different countries. Finance Research Letters, 20, 47-62.